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# PANEGYRICK

ON THE

*Newtonian* PHILOSOPHY,

SHEWING THE

NATURE and DIGNITY

OF THE

SCIENCE;

AND

Its absolute Necessity to the Perfection of HUMAN  
NATURE; the Improvement of ARTS and SCI-  
ENCES, the Promotion of true RELIGION, the In-  
crease of WEALTH and HONOUR, and the Com-  
pletion of HUMAN FELICITY:

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By B. MARTIN. *k*

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*Fælix qui potuit Rerum cognoscere Causas.*

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THE SECOND EDITION.

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PAINEGYRIK

ON THE

NEW WING THE

NATURE and DIGNITY

OF THE



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# PANEGYRICK

ON THE

*Newtonian* PHILOSOPHY.



AS an *Eulogium* on PHILOSOPHY is my profess'd Design, I shall set forth its Dignity and Excellence, and expatiate in its Praise, thro' a Series of Speculations on its Nature, Subject, and End ; and the Utility, Pleasure, and Happiness which from thence redound to Mankind.

The Nature of Philosophy is Science itself ; its Essence is *Knowledge* ; and *Wisdom*, in all its various Branches, makes up its constituent

*The Design  
of this  
Piece.*

*The Na-  
ture of  
Philosophy*

stituent Parts. These are all synonymous Terms, and (as is well known to the Literati) are implied in the *Etymon* of the Word; for what in *Greek* is call'd *Philosophy*, is, in plain *English*, a *Love of Wisdom*, or a *Disposition to Knowledge and Understanding*. Is there, then, any Dignity in Science? Is Knowledge a noble Quality? Is Wisdom in every shape Praise-worthy? Then so is Philosophy; such is that Science, whose every Attribute is founded on something superlatively great and sublime.

*It excels  
all Profes-  
sions in this  
respect.*

There are, indeed, other Professions whose Nature consists in Science, but in no respects comparable to that of Philosophy; for this has for its Subject Things of the highest Nature and Concernment, is most extensive, and conduces to the greatest Ends, and the most general Good; whereas theirs is more restrain'd and particular, conversant with Objects of a much inferior Nature, and lesser Importance, and answer only a few (and those not always necessary) Ends. Thus *Poetry* is the Science of versifying, *Musick* of modulating Sounds: *Grammar* teaches the Use of Letters and Words; *Rhetoric* gives Rules for speaking floridly, and so of others; but these Sciences are evidently little more than the Embellishments of human Life, whose *Summum Bonum*, or real Bliss, is wholly derived from the pure Fountains of Philosophy.

Nor

Nor am I here to be understood according to the common Acceptation of the Word PHILOSOPHY; for what vain Imaginations, what whimsical Conjectures, what presumptuous Hypothesis and wretched Reveries of every Sort, have not at Times been ushered into the World, and gilded o'er with this respectable Name. The Stoics of old abused it to subvert the Nature of Things, and to persuade us out of our Senses, which all conspire to convince us that *Pain is an Evil*. The *Sceptic* also takes this venerable Word in the most abusive Manner, to enforce a Doctrine directly repugnant both to Common-Sense and Reason, viz. *The Uncertainty of Demonstration itself*. Again, the *Democratic School* would make us believe, that Particles, of inert Matter, from their most chaotic State, could dance into *Form* and *Order*, compose harmonious Systems of Worlds, establish Laws of Motion, and be productive of Increase, Life, Sense, and Soul in all its various Degrees, in themselves alone; and to this they were impious enough to give the Term *Philosophy*. These monstrous Positions have been an *Opprobrium* to the Science; and against these only it is that the Apostle inveighs, when he dehorts from the *Philosophy and vain Deceit* of the Heathen.

*True Philosophy distinguished from the false.*

*Among the Ancients.*

Yet farther, our modern Sceptics have improved upon the Ancients, and would have

*Among the Moderns.*



have us doubt not only of the Accidents of Bodies, but even of Matter or Substance, itself. They, forsooth, tell us, that all Things may consist in Phantasy and Idea, without any such thing as real Substance, or solid Particles of Matter in the World. *Descartes* has also adopted the old atheistical Tenets of *Lucretius*, with somewhat of a Fineness, and makes a World *a-la-Mode de Paris*. A Horse and a Clock, with him, are only two different sorts of Machines, both equally destitute of Life and Sense; and this they have presumed to call by the Name of *Philosophy*.

*The Attrib-  
utes of  
true Philo-  
sophy*

Not such is the Philosophy of which we treat, but as different therefrom as Light from Darknes, as Reason from Absurdity, or Truth from mazy Error. It affronts not Common-Sense, controuls no reasoning Powers, nor contaminates our Minds with impious and irreligious Sentiments. On the contrary, it is every way agreeable to, and nicely quadrates with the purest Dictates of them all; a System of plain and genuine Truth, and inspires such Principles only as naturally tend to correct our Senses, to improve our Reason, to enlarge our Understanding, to illumine the Mind, and raise the Soul to the highest Pitch of rational Knowledge our Nature will admit of in this earthly State.

From

From what has been said, and from a *Philosophy the highest Perfection of our Nature.* Consideration of our own Being, it evidently appears, that Philosophy is the greatest Excellency, and the highest Perfection of human Nature. For what is our Make or Constitution, but Body and Mind. As to the first, 'tis plain we are not denominated Men from thence; for Body consider'd as Matter only, is common to all Things in this World; and Body consider'd as endued with a Power of *Growth* or *Increase*, is common to VEGETABLES and Fossils. Again, Body consider'd as animated or endued with *Life* and *Sense*, is common to every Species of ANIMALS in Nature, even the *Oyster* and the *Polype* enjoy these Prerogatives; and it is very much to be question'd if Mankind be not, in this respect, inferior to any other Animal, the meanest Reptile not excepted. *Which does not consist in an animated Body,*

As it is not in the Matter of Man's Body *nor in the human Form,* that we are to seek for the Excellence and Dignity of our Nature, so neither does it result from the *Form* of Man. For all that can be said in this respect, is no more than this, That the *Form* of our Bodies is the most commodious, and best adapted to answer the Purposes of human Life; and as much as this may be said for the Form of every Animal. Besides, the Difference between our Bodies and that of a Brute, (*i. e.* a Quadrupede) is rather in the *Position* than *Form*

*Form* of the Body, for the Parts are nearly the same in both ; only they have a prone Position, we an erect one; they walk on *all four*, we only on our *two (hind) Legs*. Perhaps the *want of a Tail* may be urged by some as a Decency peculiar to the human Form ; but in this respect too we are but on a Par with some of the *Monkey Tribe*, particularly the *Ouran, Outang, or Chimpanzee*, who not only has no Tail, but walks erect, shews a Body less hairy than some of the human Species, and seems to talk as intelligibly to us, as any of his fellow Natives of *Angola* would do, in our own Shape.

*but in the  
Powers of  
the Mind.*

Since, then, we have little to vaunt of on account of our *corporal Qualities*, there must be some other Principle in which the Dignity and Superiority of human Nature consist; and that can only be the MIND. It is the MIND of Man by which he excels all other earthly Beings. This alone is that *Image and Likeness* of the DEITY in which he was first form'd, and from whence all real *Humanity*, is derived: Nor is it the natural, the rude, and undisciplin'd Mind, the thing we are speaking of ; this is no more than what we properly call *Instinct*, and what is common to us likewise with the Brute Creation, according to their several Kinds. But the Mind which is properly and truly *Human*, is that only which is well inform'd, and fraught with proper Erudition, and the Seeds  
and



and Principles of natural Knowledge ; that is, with TRUE PHILOSOPHY. Philosophy is to the Mind what Quicksilver is to the polish'd Glass, it foliates the Understanding, and causes it to reflect the *lively Image* of infinite Science and Wisdom.

PHILOSOPHY, therefore, is the only Source of all true Glory and Greatness in the human Mind, and the ultimate Perfection of our Nature. For herein does the Life of Man most properly consist; without Philosophy we cannot be said to live a *human Life*, which does not consist of a *State of Sensation for so many Years*, for this is a brutal or mere animal Life; but is measured by a *Succession of rational and sublime Ideas, which pass in a given Time in the Mind*. Thus he who revolves twice the Variety of Ideas in his Mind, in the Space of one Day, lives as much in that one Day, as another does in two, whose Conception is but half so extensive. Consequently, those who have the most capacious Minds, and comprehend the greatest Variety of noble and exalted Ideas, enjoy Life in the greatest Perfection, and in the highest and most exquisite Degree. As on the other Hand, those who are Strangers to Philosophy, that is, who are actuated only by animal Instinct, or Sensation, and the vulgar Ideas thence arising, can scarcely be said to *live at all*; these should be look'd upon as so many Abortions, or Miscarriages in forming the ge-  
B
And those  
are made  
perfect only  
by Philo-  
sophy.
nuine

nuine human Mind. These are not so properly call'd *Men*, as *hominiform Animals*, or Creatures in the *Shape of Men*.

*Philosophy  
alone can  
form the  
Soul of  
Man.*

As the Body without the Soul is dead, so the Soul, without a philosophic Erudition, is, in a manner, dead also; for thus it only animates the Body, and degenerates into meer human Instinct. Knowledge is to the Mind what Food is to the Body; without Food there can be no Nutrition, no Growth, no Salubrity in the Body; and without natural Science, or Philosophy, the Mind or Soul of Man can receive no Increment, no Expansion, no Perfection or Consummation, but is little, low and weak; and an universal and insurable Cachexy consumes such depraved and emaciated Minds.

*The high  
Estimation  
of Philoso-  
phy among  
all wise  
Men.*

Is Knowledge, then, so necessary, so natural, so essential and important a Principle to Man? No wonder we find it so amiable and desirable to, so arduously sought after, and exquisitely delineated, by every wise and well-form'd Mind. Let us only observe in what sublime and figurative Strains this sound Knowledge, or true Philosophy, is characterised and recommended by the ancient eastern Sage, under the Person of divine Wisdom.—*Doth not Wisdom cry, and Understanding put forth her Voice?—Unto you, O Men, I call, and my Voice is to the Sons of Men. O ye simple understand Wisdom, and ye Fools be of an understanding Heart.—Re-*

*Proverbs,  
Chap.  
VIII.*

*ceive*

ceive Instruction, and not Silver; and Knowledge rather than choice Gold. For Wisdom is better than Rubies; and all the Things that may be desired, are not to be compared with it. Riches and Honour are with me.—I lead in the Way of Righteousness, in the Midst of the Paths of Judgment.—The Lord possessed me in the Beginning of his way, before his Works of old. I was set up from everlasting, or ever the Earth was.—When he prepared the Heavens I was there.—When he established the Clouds above.—When he gave the Sea his Decree.—When he appointed the Foundations of the Earth. Then was I by him, and I was always his Delight.—Now therefore hearken unto me, O ye Children.—Hear my Instructions and be wise.—Blessed is the Man that heareth me, watching daily at my Gates.—For whoso find me findeth Life, and shall obtain Favour of the Lord. But he that sinneth against me wrongeth his own Soul: All they that hate me love Death.—What a noble Allegory is here of this divine Science? And how emphatically is it recommended to Mankind? How great the Blessings which attend it? And the Wretchedness of those who slight and neglect it.

The SUBJECT of Philosophy is that *Philosophy* which, next to its Nature, enobles it, and *is most excellent in* gives it the Preheminence of all other Sci- *respect of* ences. Every Science derives the greatest *its Subject.* Part of that which makes it amiable to Mankind



kind from its Subject. For tho' all Knowledge is, in itself, valuable and desirable, and tends some way or other to a general Good, yet every Branch is not equally pleasant and agreeable in the Pursuit, nor attended with equal Advantage to the Student. But what Science can compare with Philosophy, in regard to the exquisite and ineffable Pleasure and Transport that never fails to arise in a well-formed Mind from its Subject, (*i. e.*) from a Contemplation of the manifold and wonderful Works of God.

*Viz. the  
general  
Contem-  
plation of  
Nature.*

The Business of this Science is to enable us, in a proper manner, to consider the HEAVENS, that is, the infinite Space, the interminable Void, the *To-pan*, or *Universe*, of all created Worlds, the *Sun* and *Stars* which God has ordain'd; it shews us that Suns and Stars are synonymous, and must equally imply those immense Fountains of Light and Heat, which, in form, govern and animate a System of revolving Planets: And thus it astonishes the Mind with a certain and indubitable Proof and Prospect of an Infinity of Worlds, and creates an Idea every way worthy of, and adequate to the Notions we ought to entertain of an infinitely wise, perfect, and powerful Being.

*Particu-  
larly our  
own System  
or World,  
as govern'd  
by the Sun,*

PHILOSOPHY, in the Degree it is imparted to us, can, indeed, contemplate only one of those innumerable Worlds particularly; but then, from this alone, it fills our Minds with sublime

sublime and august Ideas; Ideas strange and incredible to the uninstructed unphilosophic Mind. The *Virtuoso* is hereby taught, that the SUN is made not only to rule the Day, or enlighten one Earth, but many; that it is not a small but an immensely large Body of concentrated Fire, the constant Emanations of which give Light, Life, and Motion to every Creature in each revolving World.

For by this Science we farther learn, that the *Sun* informs a beautiful and harmonious System of planetary Bodies, which constantly revolve about him, govern'd by one equable and universal Law. That these planetary Orbs are not small Points of shining Light, as they seem to the uninstructed Eye, but large, very large and opaque Bodies, which have no Light in themselves, but shine with the borrow'd Light of the Sun : and among these Philosophy shews us our EARTH, the terrestrial Ball on which we live ; it convinces us that it revolves about the Sun like the rest, but in a smaller Orbit, and at a nearer Distance than many of them : It shews us that (whatever high Opinion we may have of our native Globe) it is very small indeed, yea, almost inconsiderable, in regard of some of the other Planets, one of which is at least a thousand times as large, and others at such a Distance, that so small a Planet as our Earth quite vanishes from their Sight.

Phi-



*and Secondaries, or Moons,*

Philosophy discovers to our View a Scene of secondary Worlds, or Systems of secondary Planets, circulating about the Primaries as they do about the Sun, and accordingly by one and the same universal Law. And as we know one of the primary Planets (*viz.* our Earth) to be the Habitation of infinite Species of Animals, and productive of as great a Variety of Plants, Minerals, Fossils, Earths, &c. so by Analogy we are taught to understand the same of all the rest. Thus also the Philosopher, by descrying various Mountains, Hills Valleys, and extensive Plains in the Globe of our Moon, justly concludes the same Things are to be observ'd in those of *Jupiter* and *Saturn*, by the Inhabitants of those Planets : and hence infers the various Globes, which compose our System, are so many particular habitable Worlds; and that, therefore, every System, proper to each solar Star, thro' all the Infinity of Space, are so many habitable Worlds, of numberless different Beings, possessing every Degree of animal and vegetable Life ; and this creates in our Minds a most sublime and august Idea of the Works of creating Power and Wisdom, highly worthy of the divine Author, and deserving our serious Contemplation and Curiosity.

*And to have the Vicissitude of Seasons, Day and Night, &c.*

By this divine Science, we are adduced to a yet more intimate Knowledge of the Nature of these remote and (to the Vulgar) unknown



known Bodies. We hereby discover not only their Motions about the Sun, but, in many of them, a regular and uniform Motion about their own Axes; and not only that, but also the Times in which those Motions are perform'd; so that of course we are hereby taught that they have alternate *Day* and *Night* (as well as our selves) throughout their Years respectively. Not only this, but even the different Lengths of Days and Nights in those Planets, are demonstrated by philosophical Discoveries: And, again, we are hereby assured they enjoy a *Variety* or *Vicissitude of Season*, in some a greater, in others a less degree than what we find in our own Globe.

Yea, so exquisite are the Researches of this Science, that the same Motions we have been describing in the Planets, are discover'd in the Sun itself. For the Center of the Sun is constantly describing an Orbit about the common Center of Gravity of the System, and at the same time the Body of the Sun uniformly revolving about its own Axis; which two wonderful Motions of this great Luminary, are to be known only by the Votaries of Philosophy.

Farther, we are hereby shewn, that not only in the Moon, but in all the celestial Bodies in general, there are different kinds of Matter in their Composition; the greater Part

*It also discovers two Motions in the Sun,*

*Also the Maculæ, or Spots in the Sun and Planets.*

Part of which will reflect Light, and shew them luminous; but the other will not, by which means, in those Parts, they appear dark, and are variegated with Spots. Nor is there any of those Bodies so remarkable in this respect as the Sun itself; for tho' it be the very Effence of Fire, it has, nevertheless, some very dark Parts, of a surprizing Magnitude, which emit no Light, and are variable as to their Form, Bulk, and Appearance.

*Philosophy  
only has  
perfected  
the Doc-  
trine of  
Comets.*

Besides the celestial Scenes hitherto mention'd, Philosophy presents us with a View of one more, tremendous, indeed, to the Mind, devoid of Science, but the greatest Instance of Wisdom, Order, and Harmony that can be found for curious Contemplation. The BLAZING COMET cannot more surprize and terrify the Peasant, than it delights and gratifies the Mind and Sight of the Philosopher. Charm'd with the rare Phænomenon, he bids, for a while, adieu to indifferent Things, and attends, with Transport, the novel Object of the Skies. Conducted by Philosophy, he views, with telescopic Eye, the wondrous Ball, contemplates its rapid and accelerated Course towards the Sun, its near Approach to the Sun's Body, the amazing Lengths of its ascending rarified Atmosphere of kindled Vapour, which he is taught to measure, and finds it to extend

tend many Millions of Miles among the Spheres of neighbouring Planets. He views, intrepid, the mighty Flame, oft whirl'd with impetuous Force across the Path of the Earth : He follows the departing devious Planet, as far as Sight will permit ; and can afterwards easily attend him, in his Mind, to its most distant Retreat, in the dark and empty Regions of Space : He sees it diminishing in Heat, contracting its Tail, and retarding its Course to the last. Philosophy then unfolds the Laws of its Motion, determines the Form of its Orbit, and establishes a Theory for Calculation, as certain as in any of the less erratic Planets.

By Philosophy we are taught to understand the Nature and Cause of ECLIPSES ; *And also of Eclipses.* and enabled to fore-tell, for any Time to come, when these Deficiencies of Light will happen in either Luminary. Also, what the Quantity thereof will be, the precise Time of their Continuance, when visible or invisible to us, or to any Part of the Globe. So that what the Vulgar Mind is unexpectedly surprized with, the Philosopher naturally looks for, and knows must happen, in consequence of the establish'd Laws and Order of the heavenly Motions.

From celestial Regions we descend to the Neighbourhood of our own Globe, *Also the Nature and Properties of Air,* which



which we find every way furrounded with a *fine invifible Matter*, call'd the ATMOSPHERE, or AIR. And here what wondrous Scenes of fublime and ufeul Knowledge does Philofophy difclofe! We here learn the true Origin, the Generation, the various Properties and Qualities of this fubtile, ethereal Matter; we are taught the Reason of its *Weight* and *Pressure*, and how to eftimate the Quantity thereof, fo amazing to the unexperient'd Mind. We are farther instructed into the Cause of the *Elasticity* or *Spring* of the Air, and know from hence its Fitefs for the *Propagation of Sounds*, for *Refpiration in Animals*, for *Vegetation in Plants*, and for various other Purpofes in the Oeconomy of the World. The various *Density* or *Rarity* of the Air, is a Matter which Philofophy fets in the cleareft Light; and hence we fee the Reason of the *Rife of Vapours*, and the *Formation and Sufpen- fion of Clouds* to various Heights therein. We hence learn how it becomes the proper Medium for the Generation and Production of all kind of *Meteors*, as the *Aurora Borealis*, *Lightning*, *Hail*, *Snow*, &c. We are alfo made acquainted with the particular Manner in which it *detains the Light* to render all Things vifible about us; and the abfolute Neceffity thereof, for the Exiftence of *Fire and Flame*. Thefe and many

And its  
various  
Meteors  
are hereby  
known.

many more, are the noble Topics of philosophic Erudition, in this Part of Nature's handy Works.

Philosophy now conducts us to the exquisite Contemplation of Light, and her Lessons on this Subject are beyond all Expectation clear, subtle, and sublime. We are here convinced of the true Nature of that sort of Matter which enlightens the whole Mind, and renders all Things visible to the Eye. We now see it clearly prov'd that Light is not a *Quality of Bodies*, (as the *Pseudo Philosophers* taught) but a *real Body*; or specific Substance, which is found to possess all those Properties and Qualities which are common to all sorts of Matter. We find in it *local Motion*, and are assured of the true *Velocity of its Motion*, to a surprizing Degree of Exactness. We are at the same time made to see, that the Velocity of Light incredibly exceeds that of any other sort of Body: We hence learn also the exceeding Tenuity or Smallness of its Particles, and how by this means it is fitted for the Medium of Vision. Lastly, we are taught the particular manner in which Light acts upon other natural Bodies, and they upon it; and from hence are enabled to account for the principal Phænomena of Nature.

*The whole  
Doctrine of  
Light owing  
to the  
Newtonian  
Philosophy.*

And the  
Nature  
and Cause  
of Heat  
and Cold,  
Fire and  
Flame.

Thus we are shewn, by true Philosophy, how the Particles of Light, by their extreme Velocity, actuate the Parts of all Bodies, (which they enter by reason of their Smallness) and thereby produces all the different Degrees of *intestine Motion*, and consequently of COLD, WARMTH, HEAT, FIRE, and LUMINOSITY, which depend thereon. And as these Qualities of Bodies are produced by Light, so they produce an Infinity of others, and are the Cause of most of the Operations of Nature, as we shall shew in the Sequel of these Reflections. Hence we see how Light comes to be the most universal Agent of Nature, dispensed thro' all the System from the *Magazine or Receptacle of Fire* in the Sun's Body..

Also the  
true Prin-  
ciples of  
Optics.

By Philosophy we also learn the particular manner in which *Bodies act upon Light*, viz. by *reflecting, refracting, and infecting* the Rays thereof; also, the determinate Laws by which each of those Operations are perform'd, together with the various Powers in different Bodies which produce those Effects. And hence the Foundation and Principle of the most delightful Science of OPTICS are clearly understood.

And the  
whole  
Doctrine of  
Colours.

By the PHILOSOPHY of *Light*, it is that we arrive at the true *Doctrine or Cause* of COLOURS: We are thereby taught how they



they all arise from the different Action of the Particles of Light, on the Expansion of the Optic Nerve in the Eye; and that these result wholly from the different Magnitudes of the Particles of Light, which is demonstrated from the *Analysis of Light*, by Experiments of the *Prism*. Hence the Reason why one and the same Body is susceptible of any Colour whatsoever, and will appear of one Colour by *Reflection*, and of another by *Refraction*, Hence the Doctrine of *Composition* and *Transmutation of Colours*: Hence lastly, the Cause of the *Variety and Inversion of Colours* in the *celestial Bows*; of *Haloes*, *Parbelia's*, &c. becomes clear and evident to the strictest mathematical Demonstration.

By PHILOSOPHY we learn the true Cause of *Transparency* and *Opacity* in Bodies, and know it to be just contrary to the Vulgar Opinion: For Bodies are pellucid on account of the Smallness of the Parts and Pores; and *opaque*, when they are large: The most opaque Body becomes transparent by a sufficient Diminution of its Parts; and the most transparent will become opaque by enlarging its Pores. And the Reason of all this is evident on the Principles of this Science only.

Philosophy

*It investi-  
gates the  
Nature,  
Causes,  
and Quan-  
tity of Mo-  
tion*

Philosophy not only searches out and demonstrates the *Laws of Motion*, in the grand Machinery of mundane Systems, but likewise explores and settles the same with respect to the mutual Action of all Bodies upon each other, whether *mediate*ly, by any intervening Power, or *immediate*ly, by *Contact* or *Percussion*. It is this Science alone that can give us any proper Ideas of *Motion* and *Rest*; all we can have without are absolutely uncertain in their *Quantity*, and false in their *Direction*. Or, in other Words, no Man can tell whether a Body does really move or not, nor which way, nor with what Degree of Velocity, unless inspir'd by Philosophy. The *Quantity of Motion* or the *Percussive Force*, in any case of striking Bodies, is not to be estimated or understood but by the Axioms of Philosophy: And that *Action* and *Re-action* between Bodies are equal, or that the moving Cart acts upon the Horse, as much as the Horse does upon it, never sounds absurd but to the unphilosophic Ear.

*And is the  
true Foun-  
dation of  
Mechanics.*

The *Doctrine* and *Science* of MECHANICS is purely philosophical, as it depends entirely on Gravitation, and the Laws of Motion. While, therefore, PHILOSOPHY unfolds to us the *Nature* and *Laws of centripetal and centrifugal Forces*, and the Manner in which Bodies affect each other thereby,

thereby, we evidently see all that relates to the *Gravity* or *Weight* of Bodies, and to the various *Momenta* or Forces with which they act on each other by means of Instruments, at different Distances, and with different Quantities of Matter: And in this consists the whole *Theory of mechanic Science*. Hence the particular Properties, and a just Estimation of the Forces of all the simple mechanical Powers, (as they are call'd, viz. the LEVER, the PULLEY, the AXIS IN PERITROCHIO, the INCLINED PLANE, the WEDGE, and the SCREW, (together with all Kinds of BALLANCES) at once become known; and from thence the Structure and Powers of all *compound Engines* and *Machines*, as *Cranes*, *Mills* *Clock-work*, &c. become facile to the PUPILS of *Philosophy*.

From the more obvious Powers of Nature, we are led by Philosophy to a view of her more secret and amazing Scences of Action: We have here open'd to our Minds the *wondrous Laboratory of Nature*, and the stupendious Processes therein carrying on, unheeded and unthought of by the Vulgar. This Part of Philosophy is the *Microscope of the Mind*; we hereby view all the small Particles of Matter, endow'd with a *mighty Power of Action*, by which they are constantly actuating each other by ATTRACTION OR REPULSION; and hence

*And the mechanical Powers.*

*It explains the Laws of Attraction and Repulsion.*



hence ensues, that Variety of *Properties, Qualities* and *Phænomena* depending on the *Figure, Size, Motion, and Action* of the Corpuscles, or constituent Parts of Bodies.

*And there-  
by the va-  
rious Pro-  
perties of  
Bodies.*

Thus we are shewn, that those Particles, by attracting each other, do cohere together with various Degrees of Firmness, according as they touch by a greater or less Quantity of Surface; and thus constitute all Variety of Bodies, with different Degrees of Consistence, from the *Hardest* to the *Softest*, and from the most *fix'd* to the most *fluid* Bodies in Nature.

On the other Hand, we are taught by the Precepts of this Science, that when the Particles of Matter are separated beyond the Sphere of Attraction, there commences a *repulsive Power*, by which they equally and mutually repel each other, and by this means acquire what is usually call'd their *Springiness* or *Elasticity*. Hence the prodigious Force of all *elastic* Fluids, as Air, heated Vapour, &c. is easily accounted for on this Principle of a *centrifugal Force*, actuating the separated Parts of Matter.

*Also the  
Rationale  
of the va-  
rious Pro-  
cesses of  
Chemistry.*

On this PHILOSOPHIC THEORY depends the Solution of all the Phenomena attending the various Processes of Chemistry: We hereby see the Reason why, upon a Mixture of different Sorts of Matters, there

there often ensues a violent intestine Motion in the Mixture, by which various Degrees of Heat, and sometimes *Flame*, are instantly produced, attended with great *Ebullition* and *Colluctation* of the Parts: We see how *solid Bodies dissolve* in various *Menstruums*; and *fluid ones* become *fix'd* and *hard*. We see why *heavy Bodies* are suspended in *lighter Fluids*, and the opakeſt render'd by Solution the moſt transparent: And the Methods of analyſing all kinds of natural Bodies, and examining their component Parts or Principles, are clearly pointed out. Yea, ſo far does Philoſophy proceed in the Powers of Nature, as almoſt to create any Body required, from the given Principles of Matter, and their known Laws of Action.

Furthermore, Philoſophy conducts us *And the Nature of Fossils, Ores, and Metals.* to the interior Receſſes of the Earth, and there ſhews us the mighty Operations of Nature; ſuggeſts to us the Manner how *Metallic Ores* are generated; how Earths concrete into various Forms of *Stone*; how *Sulphur*, *Salts*, and other Principles of natural Chymiſtry, produce the Variety of mineral Waters; why ſome are hot and others cold; the Cause of *Earth-quakes*, and the *formidable Eruptions of Volcanoes*, are no longer Secrets in the School of Natural Philoſophy.

*The Nature and Laws of fluid Bodies hereby shown.*

The *Nature* and *Laws* of FLUIDS are ascertain'd by no other Science but Philosophy: We here see all that is necessary to constitute Matter a *fluid Substance*; and as such we see the different Manner in which they act from solid Bodies, and thence learn every thing relating to their absolute and specific Gravities, the Quantity and Force of Pressure, the Reason why any thing *sinks* or *swims*, the Nature and Use of the *Hydrometer*, the *hydrostatic Ballance*, and every thing else in the Compass of that Part or Branch of the Science, call'd HYDROSTATICS.

*Also the Nature of Springs, and Theory of the Tides.*

Again with respect to the *Motion of Fluids*, (or the Science of *Hydraulics*) how excellent is the Service of PHILOSOPHY? Before this Science enlighten'd the literary World, with what Uncertainty did we grope after the true Origin of *Springs* and *Fountains*? How poor were our Notions of the *Motion of Fluids* in general! We knew nothing of the Theory of *Aquæducts*, or the Reason why Water rose in *Pumps*: The Suspension of Quick-silver in the *Barometer*, was a mighty *Mystery*; nor could they ever account for the Action of so much as that most simple Instrument the *Siphon*, or common *Crane*: Much less could they estimate the Force of *sprouting* Fluids, or say what the Action of the Air must be to move the Sails of a Mill.



Mill. As to the Doctrine or *Theory of the Tides*, that was indeed vulgarly adjudged to be the Effect of the Moon, but how, and according to what Laws it is effected, was a Matter too deep and difficult for any but *Wisdom's ELDEST SON* to investigate and explain.

Then as to the *Doctrine of WINDS*, And the true Theory of the Winds Philosophy accounts for all their Phænomena on the plainest Principles; and shews why some are *constant* and *invariable*, why others are *periodical* and *alter-native*, and why, in all great Latitudes, the Winds are *uncertain*, both as to their *immediate Cause*, and also as to the *Course or Point of the Compass* from whence they blow.

The NATURE and THEORY of SOUNDS, The Doctrine of Sounds is only from hence to be understood. and consequently what may be properly call'd the *Science of Harmony*, was never understood till Philosophy brought it to Light; and this was not till *Newton's* Days. From him we learn the true Cause of Sounds, and trace them from the tremulous Body, thro' all the elastic aerial *Undulations*, to the curious *Structure and Mechanism* of the *Ear*. From him we are taught wherein their various Differences consist; why some are *loud*, and others *low*; some obtuse, and flat, others sharp or acute; some more agree-

and also  
the Science  
of Music.

able, and others less so. Hence all the Grounds of HARMONY, MELODY, and MUSIC, are derived; The *Rationale of musical Proportions*, the *harmonical Division of Lines*, the *Structure of Organs*, *Harpsichords*, and other musical Instruments, are all the natural Result of PHILOSOPHY.

The Na-  
ture of  
Vegeta-  
tion here-  
by disco-  
ver'd.

If we look into the *vegetable World*, what amazing Scenes does Philosophy present to our View! Here Nature annually unfolds itself, vegetates and grows into *Plants* and *Trees*. The GENERATION of PLANTS is a mysterious and inconceivable thing; but Philosophy acquaints us with the wonderful Manner thereof. It shews us each Plant in its *Embryo-State*, in the pre-existent Seed, and thereby convinces us of a Truth incomprehensible and incredible to vulgar Minds, *viz.* That every Plant, of every kind, was completely in all its Parts, included in the Seed of each preceding Plant; and so the whole Tribe were all contain'd and included in infinite Miniature, in one respective original Seed.

The true  
Theory of  
vegetable  
Produ-  
ctions.

Philosophy next apprises us of the curious and exquisite Apparatus of Parts for the Production of the Embryo-plant. The Scene here lies in the *Flower*, whose delicate Attire is destin'd not only for *Beauty* and *Fragrance*, but principally for the Purposes

Purposes of Generation. To this End serve the *Stamina*, with their *Apices*, and included *Farina*; the *Stylus* and *Matrix*, with its included Seed: which latter Part makes all that agreeable Variety of FRUIT so desirous and delightful to the Taste.

By our philosophical Researches we have been enabled to make great Improve-<sup>The Me-</sup>ments in the Knowledge of the *Make*<sup>chanism</sup> and *Structure* of the Bodies of Plants and <sup>and Tex-</sup>Trees: We see the wondrous System of attracting capillary Vessels, which imbibe and draw up the SAP, or nutritious Juices of the Earth, by means of the *Roots*, and which is constantly perspired off by the *Leaves*. Besides these, we find other Vessels destined to supply the Plant with Air; and astonishing it is to consider how each annual System of Air and Sap-vessels (which makes the *Annulus* or Ringlet of Wood, by which the Tree does each Year encrease its Bulk) unravel and expand itself from the *Bark*, in which all the Bulk or liguous Part of the Tree is originally contain'd. These and many other curious and engaging Speculations in BOTANY, we owe entirely to the Invention of *optical Glasses*, and consequently to our favourite Science PHILOSOPHY.

But in nothing is the Excellence of Philosophy so conspicuous as in its sublime <sup>The Na-</sup>Discoveries relating to the Nature and <sup>ture and</sup>Structure <sup>Oeconomy</sup> of animal <sup>Bodies.</sup>



Structure of animal Bodies, and the Use of the several Parts. By this Science we are taught the *divine Laws* of *animal Mechanism*; not in the low nonsensical Notion of the *Cartesians*, who consider *Animals* as meer Machines, devoid of Life or Sensation: On the contrary, true Philosophy represents an animal Fabric as one of the noblest Works of God, in which *dead Matter* is made *to live*; inert Matter is render'd capable of Action and Motion; Matter absolutely devoid of any sensitive Faculty, endow'd with various Powers of Sensibility, in different Modes, and almost infinite Degrees. But above all, to consider how this inanimate, inert, insentient Substance should be constructed with Faculties rendering it capable of Mind and Thought, is the most mysterious and amazing Speculation! This fixes the Bounds to philosophical Enquiries; hitherto can we go, but no further. Bold presuming Man may as well pretend to make an Animal, as to account for its Powers and Functions. These are all the Works of infinite Wisdom, whose *Judgment are unsearchable*, and *Ways past finding out*.

*The animal and vital Functions.*

But however inscrutable the Origin of an Animal may be, the Laws by which the several *animal Functions* are govern'd, and the *vital Actions* perform'd, are the proper Subjects

Subjects of Philosophy; and tho' the Cause, the Manner, and intimate Texture of most Parts of animal Bodies, are latent and incomprehensible, yet it is great Satisfaction to think we are admitted to the Knowledge of the Offices, Uses, and Ends of the several Parts, and the *general Oeconomy* of animal Nature; which is one of the most agreeable and sublimer Lessons of Philosophy.

Thus we are shewn the Nature, Make, *The Uses of* and Disposition of the BONES, and how *the Bones,* they give *Firmness,* and *Stability* to the *Muscles,* Body. We are next taught the Structure *Nerves,* and Use of the *Muscles*, for giving Motion and Strength to the Parts; tho' the *Modus Agendi* (or muscular Motion) be among the Number of Nature's *Arcana*. We have lately been instructed in the true Use and Design of that noble Organ the HEART, the *Primum Mobile* of animal Nature; from hence we learn the Origin and Use of that wonderful System or Compages of Vessels we call ARTERIES and Veins for circulating the Blood and animal Fluids thro' every Part of the Body, for the grand and final Purpose of NUTRITION. Besides these, we find another wonderful Apparatus of Vessels or Parts we call *Nerves*, which have their Origin from the BRAIN and *Marrow*, and are appointed by Nature the *instru-*

The Na-  
ture of  
Sensation,

*instrumental Cause of Sensation to Animals.*  
Thus the *Optic Branch* is destin'd for  
VISION; the *Auditory Nerves*, for HEAR-  
ING; the *Olfactory Pan* for SMELLING;  
the *Nerves* spread over the Tongue and  
Palate for TASTING, and all the other  
Nerves, minutely ramified thro' all the  
Body, for the general Sense of FEELING.  
But the immediate Cause of this nervous  
Sensation, whether by means of a *fine sub-  
tile Fluid*, call'd *Animal Spirits*, passing  
thro' the hollow *Fibrillæ* of the Nerves,  
or whether by means of a *subtile ethereal  
Spirit* acting upon the solid *Capillamenta*,  
or whether this great Work of Nature be  
any otherways effected, is as yet a Matter  
conceal'd from human Intelligence.

and ani-  
mal Secre-  
tion.

But whatever be the Cause thereof, it  
is, without all doubt, derived from the  
noble *Viscus* the BRAIN: For the Brain is  
manifestly of the *Glandulous Kind*; and the  
Use of the GLANDS is to secrete the va-  
rious Juices destined to serve the various  
Purposes of *animal Life*. Thus the *Liver*  
secretes the *Bile*; the *Pancreas* the pan-  
creatic Juice; the *Kidneys* strain off the  
*Urine*; the *Breasts* collect the *Milk*; the  
*Testes* secern and prepare the *Semen*; and  
other Glands the *lymphatic Liquor*. By  
such wonderful Contrivances are the Ope-  
rations of Life carried on, and the animal  
Functions



Functions perfected thro' the determined Period of Duration for each respective Species.

These, and such like Subjects, enoble <sup>The Use-</sup> the Science of Philosophy, and give it in- <sup>fulness of</sup> effable Merit and Praise: Nor is this all; <sup>Philosophy</sup> the extreme Usefulness of this Science, and <sup>exempli-</sup> its universal and indispensable Service to <sup>fied.</sup> all Mankind, command our highest Regard for it. I have already observ'd, that it is an essential Quality of human Nature; *Man is not Man without it*: It gives us all the Preheminence and Dignity due to our Species; every thing besides being of a meer animal and sensual Nature: But to be a little more particular.

In THEOLOGY the absolute Necessity <sup>In Theo-</sup> and Importance of Philosophy is most ob- <sup>logy.</sup> servable: No Man can have any certain, any natural, any just Ideas of the *Divine Being*, or DEITY, but what he is oblig'd to this Science for. For the invisible Things of him from the Creation of the World (or from the Works of Creation) are clearly seen, being understood by the Things that are made, even his ETERNAL POWER and GODHEAD: So that they are without Excuse who pretend to know God, and discourse of his Attributes from any other Principles than those of Philosophy; which can only be esteem'd a genuine *Commentary on the*  
E *Bible.*

*Bible of Nature*, by which alone we are to be directed in forming every rational Article in the *Creed of that Faith which is according to Knowledge*.

*In Ethics.* ETHICS or MORALITY has all its Foundation in Philosophy: Are not our Manners and Behaviour proportion'd to our Knowledge and Understanding? Do we expect Virtue of the same Lustre in a little Mind as in a great one? And can Vice appear to any so enormous, deform'd, and detestable as to those who best understand the natural Rectitude of Things? Are we to wonder if those who understand not the Reason of the Laws of *Right and Wrong*, should unconcernedly transgress them? If, therefore, we would have Mankind be virtuous, and act aright, let their Minds be early form'd and embued with the Principles of *Philosophy*, i. e. of Wisdom and Knowledge.

*In Astronomy.* In ASTRONOMY we owe every great Improvement to Philosophy; yea, the whole Science itself: We hereby know the Nature of circular and elliptic Motion, and the Laws which govern Bodies moving in these or any other Orbits: We hence learn all the *Anomalies* of Motion in a System of Bodies; and can settle the *Theories* for Calculation. Hence the Places, Position, *Aspects*, *Transits*, *Occultations*, *Eclipses*, and other Affections of the heavenly

heavenly Bodies become known for any given time, past, present, or to come.

In CHRONOLOGY we are guided by the *In Chronology.* unerring Hand of Philosophy. We thence get a true Idea of TIME, and the only just Methods of measuring it; and dividing it in a natural and proper Manner. By this means our *Periods* and *Cycles*, our *Years* and *Days* become constant and certain; which would otherwise be vague and unsettled Things, and induce a World of Confusion in our Accounts, and thereby disturb the Occurrences of Life.

In NAVIGATION and GEOGRAPHY, *In Navigation and Geography.* great and manifold are the Uses of *Philosophy*. From thence we learn the Size, Dimensions, and Figure of the Earth; and by the discover'd Properties of the wonderful Stone, are enabled to navigate the spacious Seas, with much Certainty and Safety. Hence a Communication and Commerce, with other Nations and People, is open'd unto us; we are hereby made, as it were, Proprietor as well as Inhabitants of the Earth: And most of the Wealth and Commodities of Life are owing to this philosophical Improvement of the natural Properties of *Wind* and *Water*.

In MECHANICS, who does not know *In Mechanics.* that every Axiom, every Principle, every Process, depends upon, and is deduced



from one Catholic Proposition of Philosophy, viz. *That Action and Re-action are equal; and that the Action, or Force of Action, is compounded of the Quality of Matter and Velocity conjointly*, in every moving Body. On this single Principle we account for all the Effects of every mechanical Power or Machine, whether simple or compound. For not only the Lever, the Pulley, the Wheel and Axle, the Wedge and Screw, but the Action and Effect of almost every Instrument for moving heavy Bodies, and every Edge-Tool for dividing Bodies, have their Theory and Rationale in the Principles of *mechanical Philosophy*.

*In Mathe-*  
*matics.*

Yea, GEOMETRY itself is but the Philosophy of the Magnitude and Dimensions of natural Bodies, and their various Proportions and Relations to each other on that Account: And no one who understands any thing of the *modern Newtonian Mathefis*, can deny, that its very first Principles, (viz. The *Doctrine of FLUXIONS*) consist in the Doctrine of Motion, and Velocity of the generating Powers of Bodies; and therefore every mathematical Science is, in its general Nature, purely philosophical: And it would be very easy to shew, that some of the most perplex'd Propositions of Geometry, are demonstrated with the greatest Ease by Philosophy;

phy; and that some Problems, impracticable by the *Geometrician*, are solvable with the greatest Facility and Exactness by the Philosopher.

In HYDROSTATICS nothing can be done to any good Purpose without the *In Hydrostatics.* Aid of Philosophy: No Man could construct the HYDROMETER, or the *Hydrostatic Ballance* in the best manner, nor direct their Uses to so many great Purposes, as those who understand the Grounds of this Science. Who could have investigated or computed the *Center and Quantity of Pressure* against any *Pen, Dam, or Sluice*, but a Person skill'd in *mathematical Philosophy*? And the Perfection of *Mill-work* is well known to depend on a thorough Skill in the Theory of sprouting Fluids, since only one certain Ratio of the Velocity of the Water, and that of the Wheel, can be admitted to answer that End.

In HYDRAULICS, the Construction of *In Hydraulics.* all Kinds of *Pump-work, Water and Fire-Engines* entirely depend on the Theory of the *Motion of Fluids*. Hence the Art of *Levelling*, the Draining of Marshes, the making of *Fountains*, or *Jet-d'Eaus*, the Praxis of *Reservoirs* and *Aquaducts*, the Building of *Bridges, Locks, Sluices*, and an Hundred other Necessaries of Life,  
owe

owe their Origin, and their ultimate Perfection.

*In Optics.*

In OPTICS, what a Variety of the most curious Inventions and Structures of Instruments has of late flow'd in upon us? Scarce a Year or Month can pass not pregnant with Optic Discoveries and Contrivances: And yet none of these Inventions, none of those Machines, owe their Origin to any other Source than PHILOSOPHY. 'Tis this Science only can discover not only why a Microscope can assist the Eye to discern small Objects, or a Telescope distant ones, but it enables the Artist to give the best Form to his Glasses, and to dispose them in the best Manner, in the Structure of these and other Instruments, to answer the Ends propos'd. And who can say to what Limits this growing Science may yet extend, under the Conduct and Direction of PHILOSOPHY.

*In Perspective and Dialling.*

I need not say that PERSPECTIVE, DIALLING, or the *Art of Shadows* in general, is purely philosophical. These Arts consist only in the various Representations and optical Views of Nature: And to represent Things under the same Appearance and respective Relation which they have to each, requires no small Art or Skill in Philosophy. How little do we esteem a meer mechanic Diallist, who  
knows



knows nothing of the Reason or Philosophy of his Art? Who sets the *Stile* of a *Dial* pointing to the *Pole*, for no other Reason but because he cannot make it shew the Hour in any other Position.

PAINTING, as it consists in an *exact* *In Painting* Imitation of NATURE, by a judicious Mixture of Colours, and a proper Disposition of various Tints, Lights, Shades, &c. must be pronounced a *philosophic Art*, whose Theory depends on the most refined Principles of this Science. A Person by a thorough Skill in the *Doctrine* of Light and Colours, might almost make a Picture *a Priori*: How natural, genuine, and excellent must that Portrait be, which is executed by a Hand whose every Motion is directed by the Dictates of presiding Science?

As to MUSIC, I have already observ'd, *In Music* that Philosophy is the very Soul of that Science; and tho' it may be learn'd as an Art, by meer mechanic Practice, and a good Ear, (as it is call'd) yet I believe if any MUSICIAN were to join the *Theory* with the *Practice*, his Compositions and their Airs would be thereby greatly improved; and the Pleasure, Sweetness, and Harmony of Sounds would be exquisitely heighten'd, even to his own Sensation. And who does not know that a Mathematician, by the bare Dint of Philosophy, can

can compose a Piece of Music, without any Assistance from either Art or Ear? Of how much more Service then must it be to those who happily possess both?

*In the Doc-  
trine of  
Projectiles.*

GUNNERY, or the *Doctrine of PROJECTILES*, is, perhaps, the only Art whose Theory is purely philosophical throughout, and that yet has receiv'd little or no Advantage from this all-perfecting Science. Till Sir *Isaac Newton's* time, all that was wrote on this Subject was errant Jargon: Since him we have had many Pieces on the *parabolic Hypothesis*, whose Theories are founded in *Vacuo*, and vacuous Theories they are indeed: Their Authors not understanding *true Philosophy*, could not instruct Mankind in the *Principles of Gunnery*; and this is but too well known an Instance of the fatal Consequences that attend either the Ignorance or Neglect of Philosophy, in the momentous Affairs of Life. However, something considerable has already been done, and more may soon be expected, to give the Engineer all the Advantages he can possibly have from the present *Mathesis* and *Philosophy*.

*In Chemi-  
stry.*

CHEMISTRY, consider'd as an Art, has its Theory wholly dependent on the philosophic Doctrine of Attraction and Repulsion: And I need only mention how much the *chemical Doctrine* of ELEMENTS has been of late improved and refined by philosophic

phic Discoveries and Disquisitions. How gross their Notion of *four Elements*! how imperfect their Number of *three*! how absolutely ignorant were they of the most considerable of the real constituent Parts of natural Bodies, in mean *Air in its fix'd State*? Again, how vulgar and unphilosophical are their Notions of *elementary Fire*? And to say Truth, it appears from their Writings, that there is nothing which they seem so little to understand as the true Nature of their most familiar Element *Fire*; and in which they stand in so much Need of the Light of the *Newtonian Philosophy*, which alone gives a rational Account of that and every other chemical Element.

In PHYSIC and SURGERY the whole *In the Art*  
Field of Philosophy, in its utmost Extent *of Healing*,  
is concern'd: For, on the one Hand, if  
we consider the human Body as a System  
of *Solids and Fluids in Motion*, this will  
require, at once, a thorough Knowledge  
in all the *Laws of Motion*, of *Action* and  
*Re-action*, of *Attraction* and *Repulsion*, of  
every *mechanical* Principle and Power,  
the *hydrostatic* and *hydraulic Laws of Fluids*,  
and every other Principle of Nature's  
Agency in one, who has the Care of such  
a noble Machine to keep it in Order, and  
to rectify it when out. On the other  
F Hand



Hand, with respect to the *Materia Medica*, 'tis evident the utmost Skill in the *philosophical Principles of Chemistry, Botany, Pharmacy, &c.* is required to render those Arts of the greatest Service to Mankind, in the Cure of Numberless Disorders to which they are liable.

And in all  
other Arts  
and Sciences.

And what shall I more say? For the Time would fail me to speak of *Anatomy*, and of *Botany*, and of *Agriculture*, and of *Gardening*, and of every *mechanic and manual Art and Trade* also, even down to *Brewing* and *Baking*; whose Professors and Artists, by the various Improvements and Precepts of Philosophy, have been enabled to explain to us the *animal Oeconomy*, the Nature of *Vegetation*, the *Culture of Plants*, the *Improvement of Land*, the *Manufacture of Goods*, and meliorating the Methods of procuring and preserving our *Bread* and our *Meat*, our *Beer* and our *Wine*. And it is in my Power to shew, that a Man in every Vocation, in every Employment of Life, has occasion enough for the Assistance of this Science; and that in every Occupation, no Artist can execute and succeed so well as he that keeps close to Nature, and best understands her Operations, which as I have shewn, is all that we are to understand by PHILOSOPHY.

If

If then all I have said be true, and who will say it is not?) if PHILOSOPHY be of that Importance to Mankind, as I have shewn it is, we need not wonder to see the wise and knowing Part of Mankind, in every Age, have so great an Opinion of such a Science, and so desirous of being initiated into its Mysteries. How ardent were the Pursuits of *Plato, Pythagoras, Socrates, Aristotle, Seneca*, and other Sages of Antiquity, after Philosophy, even in its *Infant State*? But to see and enjoy it in its present Glory and Perfection, what Studies would have been too arduous, what Voyages too dangerous, what Climates too distant for those Champions of Wisdom not to have undertaken, with the greatest Alacrity and Pleasure; How are all the great Genius's of every Age endeavouring to eternize their Memories by inventing new Systems of Philosophy? Yea, how frequently do we observe Persons destitute of all Genius, and scarce entitled to common Sense, anxiously aspiring to the Honours of this Science? So great are the Charms of Knowledge, even to the *Eunuchs of Science* themselves!

It is very remarkable, that whereas other Arts and Sciences give only a Polish to Mankind, and make them expert and ingenious; this of Philosophy, in a peculiar

*How desirable a Study is Philosophy.*

*and confers even Happiness itself on its Possessors.*

liar manner, confers not only the highest Delight, and the most transporting Pleasure to the Mind, but even HAPPINESS itself. The Attribute of Philosophy is FELICITY by general Consent; Thus the inspir'd Penman.—HAPPY is the Man that findeth Wisdom.—Thus Virgil too, FÆLIX qui potuit Rerum cognoscere Causas.

*The Means  
of attain-  
ing this  
Science.*

After discanting so largely in the Praise of a Science it may be expected I should say something of the best Ways and Means of attaining to it; but tho' this be no Part of my Design, yet it will be expedient to hint, that for those who would make any tolerable Proficiency in the Study of Philosophy, there are three several Methods for that Purpose, viz.

*First by  
reading.*

First, *Attentive reading*, or a diligent Perusal of the best Books that are wrote upon the Subject, especially those in the systematical way, if only a general Notion be propos'd. But to be a Master of the Science, requires an *universal Matheſis in the Newtonian Stile and Manner*.

*Secondly,  
by proper  
Instru-  
ments.*

Secondly, a small *Apparatus of Instruments*, for making Observations on Nature, as *Microscopes, Telescopes, an Air-pump, Hydrostatic-Balance, Barometer, Hermetometer, &c.* But especially the first of these, viz. the MICROSCOPE, both for the Rocket and for the *Camera Obscura*: For this



this one Instrument will discover more of the secret Sciences of Nature's Operations, than all the others of the optical Kind put together. They are that sort of *Spectacles* which every wise Man should wear.

Thirdly, the most ready and easy Means <sup>Thirdly, by</sup> of attaining to a general Knowledge of <sup>Courses of</sup> this Science, is a *Course of Lectures and Ex-* <sup>Experi-</sup> <sup>ments.</sup> *periments* on the various Subjects thereof. And this will readily appear if we consider only the Design of it, which is to represent the principal Appearances of Nature to the View of the Audience, and to illustrate the Nature and Truth of them by Experiments, on a large and general Apparatus of Instruments: So that such a Course of Experiments is, in reality, but a general and distinct View of Nature in Miniature; and therefore is of the same Use to the Mind, as a Telescope to the Eye. It brings the remote, confused, and distant Scenes of Nature near to our Sight; and gives a glorious Inspection of the Manner and Rationale of most of the Operations carried on therein. To say the Truth, there is no other way but this by which one can acquire any tolerable or adequate Notions of the real Principles of this Science. A verbal Account of this Science, in Books only, avails little more than *Don Domingo's* Account of the World in  
the

the Moon. If to Books we join an Apparatus of proper Instruments, we shall more rationally and successfully conduct our Enquiries and Researches into Nature: But who is there that will be at the Expence of a general Apparatus, much less of a very particular one, for this Purpose? Again, who have Leisure, and if they have, will be at the Trouble of a constant Series of Experiments, to explore by themselves the endless Mysteries of Nature? Very few, indeed: Nor can we expect it should be otherwise; for there is required for this Purpose a most peculiar and critical Genius, attended with a natural Impulse to such Disquisitions; and not only that, but what is still more rarely found, a Capacity for a *physical Matheſis* in a very high Degree; for unless a Man be qualified in all these Respects, he can never make a good Proficiency by himself in this Science, nor be any ways fit for instructing others as a *Professor*.

From what has been said we may fairly make the following Inferences to compleat the Praise or just *Encomium* of Philosophy.

*First Inference.*

First, I have already observed in general, that it is by this kind of Knowledge only that we attain to the true Refinement and

and Perfection of our Nature, which does not consist in the *Matter, Form, or Animality* of our Bodies, but in the Powers and Faculties of the Mind. The more a Person, therefore, is imbued with the Principles of this Science, the more properly he may be said to be *Human*, or approach more nearly to the ultimate Perfection and Essence of human Nature: Philosophy is, therefore, the grand Characteristic of Man.

Secondly, the great Service of this Science for improving the NATURAL SENSE, *Second Instance.* is from hence most evident. How great are the natural Blessings of Sense! And how miserable do we think ourselves when destitute of any one! when blind, when deaf, &c. How anxious are we to preserve our natural Sight, Hearing, &c. and at what great Expence of Money and Pain do we endeavour to retrieve them when lost? If these Things then are so precious and important to our Happiness, how highly should we esteem that Science which affords such vast Improvements to each of them? Nature confines your Prospect within narrow Limits, but Philosophy expands or enlarges the *Sphere of Vision* near ten Million of times by the Telescope. And by Nature we are permitted only



only to view the more gross and coarse Part of her Works ; and yet in these what Pleasures do we find ? But when Philosophy presents the Microscope to the Eye, what wondrous Scenes appear ! what numberless Objects before unseen ; what endless Variety of Species ; and what amazing Beauty and most exquisite Perfection ravishes the Eye, in its survey of this infinite new Creation ; And yet, after all, with what Indifference do we treat, and how little do we regard this surprizing Improvement of our Senses ?

*Third In-  
ference.*

Thirdly, I have shewn, that all our *moral Sense*, and *religious Sentiments*, must arise from the Principles of this Science ; and here I shall add, *That Philosophy is greatly subservient to Revelation, especially that of the Christian Religion, and easily accounts for or removes most of the Difficulties and Disputations about it.* For by acquainting us with the Manner in which primary and secondary Causes act, the first absolutely and independently, the last mechanically and consequentially, we are brought to see that the first may interpose to produce any of the Phænomena of Nature, without interrupting the Course of her Operations in the ordinary way. The Power which first produced an Acorn, might, at any time, create the Oak which bears

bears it: The infinite Wisdom that first establish'd the Order of the Generation of Animals in the common way, may, at any time, produce a Man, either adult, as the first *Adam*, or *in Utero*, from a special or peculiar Animalcule, as in the Incarnation of Christ: So that, in general, we hereby see that there is nothing absurd, unreasonable, or inconsistent with the Nature of Things, in the *Doctrine of a miraculous Power*; and consequently all those supernatural Effects, which are said to have been produced by Christ and his Apostles, are no ways unworthy of our Belief. 'Tis evident *St. Paul* often appeals to *natural Philosophy*, to illustrate and enforce the Doctrines of reveal'd Religion, particularly in the Case of the *Resurrection*, (*1 Cor. xv.*) the most important of all others. Again, we find in the large Field of Philosophy, several surprizingly analogous Representations of the different States and Life of Man: Thus the various State of the Caterpillar, Chrysalis, and Fly, (all different Forms of the same Creature) seem plainly to refer to and typify the present, the mortal, and the future glorified States of Man. I might here shew how readily most of those fruitless and perplexing Disputes, which have so much and so long distracted the Christian

G

Scheme,

Scheme, admit of a thorough Decision from the Principles of Philosophy, particularly those relating to the Soul, the intermediate State, &c. But here I must stop for fear of giving Offence: Too much Light blinds the Eyes, and puts Men strangely out of Humour. The Day is not usher'd in at once, but dawns upon us by degrees.

*Fourth In-  
ference.*

Fourthly, We hence learn of what inestimable Service Philosophy is of to Mankind, in utterly *destroying the very Foundation of Enthusiasm, Superstition, and all Kinds of Imposture.* And it is evident, that nothing but true Philosophy can do this; because these Things are wholly founded in Ignorance, and are truly Works of Darkness; But at the Approach of this Science, Ignorance retreats with Shame, and Impostors, conscious of their Villany, sculk in Corners. What glaring Instances of this Truth has this last Century produced? Where are now the Wizards and Necromancers, the Pseudo-Prophets, the Demoniacs, the Wonder-working Relicts, and the Group of Omnipotent Priests that formerly swarm'd in this Island? Why, at the Feet of Philosophy they bow'd, they fell, they lay down; where they bow'd, there they fell down dead. So let all her Enemies perish, O Lord; but let them that love her be

as



as the Sun when he goeth forth in his  
 Might.

Fifthly; it appears from what has been *Fifth Inference.*  
 said, that it is highly for the Honour and  
 Interest of every Individual to understand  
 Philosophy more or less; as it is essential  
 to the Perfection of our natural, moral,  
 and religious Sense, we cannot neglect or  
 despise it, without doing Violence to Reason,  
 yea, to our very Nature; and consequently  
 thereby incur the greatest Dishonour and  
 Shame. If we consider it in regard to  
 Mens Callings, and Business, we shall find  
 it greatly conducive to their Interest to  
 have a general Notion of this Science:  
 For it has been shewn, that it is the  
 Foundation of almost every Art in Life,  
 and gives the Rationale thereof: Can the  
 Advantage of understanding it then be  
 doubted by any Artist whatsoever? Can  
 it be thought a Man of Theory and Science,  
*i. e.* who understands the true Nature and  
 Qualities of the Subjects of his Art, should  
 not be able to manufacture and improve  
 them to a much greater Advantage, than  
 the *meer Mechanic* that knows nothing  
 but by Practice? This is so far from being  
 a Question, that we see it verified every  
 Day, in every Profession of Life, agreeable  
 to Solomon's Observation.  
 —*Seest thou a Man diligent (or dexterous)*

*in his Business? He shall stand before Kings, he shall not stand before obscure People.—The Wise only shall inherit Glory, and Shame shall be the Promotion of Fools.*

*Sixth Inference*

Sixthly, Philosophy alone is the Source of all *true, solid, or real Learning*: For what is Learning but an *Attainment to the true Knowledge of Things*? And if so, by what other Means can this Knowledge be acquired, than that of experimental Philosophy? By no other, certainly. For what can Philology do? Only acquaint us with the Knowledge of Words, and that is *meer verbal Learning*: What can *Metaphysics* do? Nothing to the Purpose, for want of *Data* and Experiments. No true Knowledge can result from Hypotheses, however so ingeniously contrived or disguised. What can *Logic* do in this Respect? Only teach us how to digest or methodize the Principles of Knowledge which we acquire by Philosophy, and Reason from them in a proper Manner. As to *Poetry*, it is so far from being the Source of any Learning, that, on the contrary, it has, for its, Subject, *pure Fiction*, which is quite its Opposite: If *Wit* and *Fancy* be your Taste, read *Poetry*; if *Wisdom* and *Learning*, attend on Philosophy. *Criticism*, notwithstanding, all its high Pretensions, has nothing in it worth the Name of

of *Learning*. As to those we vulgarly call the *learned Professions*, viz. *Law*, *Physic*, and *Divinity*, I appeal to any Man's judgment if there be any thing in the two last by which they can merit that distinguishing Epithet, which is wholly due to that *Philosophy* which is founded on *Observation*, *Experiment*, and mathematical *Ratiocination*. I take no Notice of the *Law*, it being a sort of *Learning Sui Generis*, and therefore does not come under my Cognizance. In short, let Men be ever so ambitious of being esteem'd learned, yet while they are unacquainted with the *Newtonian Physico-Mathesis*, their Learning must be extremely superficial, and fit only for meer nominal *Masters of Art*.

Seventhly, It is very manifest from <sup>Seventh</sup> what hath been premised, *That the Honour, Inference.*  
*Commerce, and Wealth of a Nation, bear a high Proportion to the Culture and Improvement of Arts and Sciences, and consequently to Philosophy, which is the Foundation of all.* The Truth of this Inference nobody will deny: For what Honour or Renown can be any how possible to an illiterate and barbarous People? In what Contempt do all Mankind hold the *Chinese*, the *Tartars*, the *Indians*, &c. for their Pride, their Ignorance, their Brutality and Inhumanity, which with all other enormous Vices, proceed



ceed from their want of Erudition, and the Study of the Sciences? Do not they who undertake to polish and civilize a savage and rude People, do it by introducing the Study of the Arts and Sciences? What an illustrious Experiment of this sort have we seen tried with Success, on the wild *Muscovites*, by *Peter* the Great? And what immortal Honours has he thereby procured to himself and his Empire? And, to look nearer Home, how different a Face does our own Nation bear at this time, from what it did a few Centuries ago? When Ignorance of Science, Slavery, and Superstition in Religion bore Sway here, what Infamy attends the History of those Times! But when Liberty came, and introduced Philosophy and true Religion, how greatly did we rise in Reputation, and how justly renown'd for Learning above all the Kingdoms of the Earth! And I think we may truly affirm, That it is more *Honour to be King of the learned British Nation, than Emperor of all the World besides.*

*Eighth Inference.*

In the Eighth and last Place we may justly infer, That *Natural Philosophy* is, in a most peculiar Manner, the Gift of Heaven; the greatest Blessing and Ornament to Mankind; the universal Parent of all Arts and Sciences; and therefore superior to them all in Dignity and Honour. That  
it

it is a Science which merits the highest Regard, and also meets with it, from all the truly Great and Wise among Men: That it stands upon the eternal Foundations of Truth, and must therefore endure for ever: That as to its Theory or *Rationale*, it is the most sublime and arduous: It is a Mystery that has been hid from Ages, and from Generations; but is now made manifest, to all Nations, by the divine Writings of the immortal Sir ISAAC NEWTON.



# STRICTURE

ON THE

ANTI-NEWTONIANS

O R,

PSEUDO-PHILOSOPHERS *of the Age.*

**N**O more let Poets boast their Golden Age,  
Nor Halcyon-Days employ the metre'd  
Page;

Let times of Darkneſs in Oblivion lie,  
And tune your Voices by Philoſophy.  
The Age of Science let the Muſes ſing,  
And to great NEWTON'S Shrine their Offerings  
bring.

His *Manes* let each grateful Sage adore,  
Who taught us more than all Men knew  
before.

Whoſe *Genius* moves o'er the Chaotic Mind,  
And gives thereto the human Form deſign'd.  
His beaming Diction did each Truth diſcloſe,  
And Error fled affrighted when it roſe.  
In Paths of Science NEWTON leads the way,  
So clear, that ſcarcely the Perverſe can ſtray.

Ye



Ye Sophs superb, lay Pride and Ign'rance by,  
 And learn of humble NEWTON—*not to lie.*  
 Let him thro' your dark Souls transfuse the  
     Light,  
 And set your aukward Wry-neck'd Spirits  
     right.

*World-mongers* vain, your Elements forego,  
 Nor how the Orbs were made, presume to  
     show.

Inscrutable are Works of Deity,  
 Read *Euclid* first and learn your A, B, C.

Ye Theorists too, who impiously pretend  
 God's Handy-Works to criticise and mend:  
 Retract your Errors, learn from common Sense,  
 All Pleasures in Variety commence.  
 Your Earths devoid of Mountains, Rivers, Seas,  
 The Wise would shun, and you alone they  
     please.  
 Let delug'd Worlds no more your Wits em-  
     ploy,  
 To Ship-wreck Nature, and our Faith destroy.

Ye Sons of fable Night, whose wretched  
     Strife  
 Is to defraud the Brute of Sense and Life:  
 Allow them Speech, they soon would change  
     the Scenes,  
 Prove *they* have Reason, *you but meer Ma-*  
     *chines.*  
 Much bolder yet, and blasphemous the Pen  
 That dares to fix on Free-born Sons of Men

H

The

The horrid Yoke of Fate, that strives to  
 blind  
 By *Laws of Mechanism* the heavenly Mind,  
 What Reason dictates, *virtuously* we chuse,  
 Nor are we *vicious*, if we must refuse.  
 Who this denies, must needs himself belie,  
 And charge his Failings on the Deity.

Ye mitred Chiefs of Error's wildest Band,  
 Who can the sov'reign Power of Truth  
 withstand,

Who even Demonstration can beguile,  
 May triumph over Reason for a while ;  
 But you at last, reluctant, shall obey  
 The Voice of Nature, and be forc'd to say,  
 The *Sun's* at *Rest*, and bears o'er all the }  
 Sway,

And thou, proud *Polignac*, shalt last defame,  
 And treat with Scandal great Sir ISAAC'S  
 Name;

Inspir'd, I pray, by what delinquent Muse,  
 Dare you, the *First and King of Men* abuse?  
 The *Nine* revere him, and with Pride com-  
 bine,

To *sing the Writings and the Man divine*.  
 Presumptuous Bard? what Mortal could sur-  
 mise

That *Poets* should on NEWTON criticise!  
 That *Fiction-Mongers* should in Learning rule,  
 And dictate to the Sage of NEWTON'S School:  
 With equal Scorn and Ridicule we hear

From

From thee a Panegyric, or a Sneer,  
 You prove a *Plenum*, sooth; and 'tis as plain  
 You prove at large a *Vacuum* in the Brain.  
 Extol *Cartesius*, let him be your Theme,  
 And o'er his *Vortices* supinely dream.  
 But the *Principia* spare, nor treat with Scorn  
 What you, to understand, were never born,  
 Shall Bards, low halting, on poetic Feet  
 Assail great NEWTON in his high Retreat?  
 Shall Wittlings, void of mathematic Skill,  
 Say what are *Nature's Laws* or *Nature's Will*?  
 Mathesis' boasted Chief, direct to weigh,  
 Number and measure what he shall essay:  
 Forbid it, Heavens! and blast the impious  
 Strain

That takes so oft you hallow'd Name in vain,  
 Against *Lucretius* let the Verse be writ,  
 Inferior much in Judgment as in Wit.  
 Here stop, meer Bard, for know the Learn'd  
 and Wise

An *Anti-Newton* from their Hearts despise:  
 What NEWTON writes, admits of no Contest,  
 This Popish Tongues, tho' pad-lock'd, have  
 confest.

Tho' *Hecatombs* of *Scribblers* him assail  
 Yet great is Truth, and ever shall prevail.

Not so elate, methinks grim *Zoilus* cries,  
 Your sanguine Hopes excite my deeper Sighs:  
 Ill-fated Incidents each Day presage  
 The direful Advent of a gloomy Age;

Reflect



Reflect how oft the most refulgent Day,  
 Precedes a Night of Horror and Dismay :  
 Your SUN is set ; and each revolving Year  
 Some *Stars of primal Order* disappear.  
 And grant I may, for once conjecture right,  
 These Times appear the Twilight of the Night.  
 For see your boasted Science set at nought,  
 How cheap is Wisdom, yet how little sought ;  
 Her Schools decline, her Pupils fall away  
 And sicken with the small Remains of Day.  
 See Dulness' Minion now the first in Fame,  
 And Stars and Garters urge him to declaim ;  
 See Judges, Prelates, and the Courtly Fair,  
 To hear the matchless Orator repair :  
 See *Nature's Senate*, erst of great Renown,  
 Now dwindling into Foplings of the Town.  
 See how their great Law-giver they despise  
 And to *Batavia's* Idol Sacrifice :  
 See Learning's disregarded Sons appear,  
 Scarce known to Fame, in *Diaries* once a Year,  
 See *Hocus-Pocus*, Puppet-Shews and Plays,  
 The gay polite Diversions of our Days :  
 See Time demolish'd with egregious Skill,  
 By Chiefs——at E, O, Billiards and Quadrille.  
 View yonder, Mankind crowding in the Lump,  
 To see the *Conjuror* in a Bottle Jump ;  
 How willingly in *Folly's Noose* they're led,  
 To see the *Necromancer* raise the Dead :  
 Lo, there your Great, your Wise, your worthy  
     Ones!  
 How justly cries *Britannia*, O my Sons !  
 Such are the Omens——

Enough,

Enough, forbear on all Mankind to rail,  
 Your Omens and Predictions nought avail:  
 Nor more alarm us with a gloomy Night,  
 The glorious Sun of Learning still shines bright:  
 And as in Fields of Æther, 'twill be here,  
 The *old* extinct, *new Stars* shall still appear.  
 The *Bats* and *Owls*, and other Birds of Night,  
 Do not abhor but *can't endure* the Light:  
 So 'tis with us; the weak and feeble Mind,  
 With Learning's mighty Blaze would be struck  
 blind.

You ne'er could Wisdom's Votaries *many* call,  
 There must be a *great Vulgar* and a *small*:  
 Nor dare that awful Synod to deride,  
 Where Eruditions favorite Sons *preside*:  
 Where *true Nobility* expands her Sphere,  
 And Lustre adds, and Greatness to the Peer.  
 Where Kings inhaunce the Glory of their  
 Crown,

And CHARLES, by founding it, acquir'd Renown.  
 There *British Genii*, with unrival'd Skill,  
 In NEWTON's glorious Cause employ the Quill,  
 What if some wealthy Noodle now and then,  
 To shew his want of Sense, employs his Pen,  
 Inspir'd by Dulness, who his Cranny fills  
 With all the Weight of Lead in Mendip-Hills:  
 Shall we from thence conclude the Age to  
 blame?

No, let such write, and curse themselves with  
 Fame.

What, tho' so few attend in Wisdom's School,  
 'Twere rash to say, that every's Man's a Fool:  
 2 Each

Each future Age a *Pope* or *Locke* may yield,  
 Perhaps a *Richmond* too, and *Chesterfield*.  
 A little Remnant we shall always find,  
 Endu'd with Sense, with Spirit, and with Mind.  
 In every Rank of High and Low you'll view,  
 A Race distinguish'd, and a chosen Few :  
 How blest their Eyes, which Nature's Beauties  
     see !

How blest their Ears, which hear her Harmony !  
 How blissful those who understand her Laws,  
 And of *each great Effect can know the Cause*.  
 Thrice happy All whom NEWTON can inflame  
 To seek, by Science and by Virtue, Fame.

Ye Sons of Art, great NEWTON's Worth  
     unfold,  
 To endless Ages let his Deeds be told :  
 To distant echoing Worlds exalt his Name,  
 And in eternal *Pæans* sound his Fame.  
 No Laurel Crowns, or Monuments prepare,  
 (Such Trophies mortal Kings and Heroes wear.)  
 In *Works of Genius* shall his Altars rise,  
 And Glory build his Temple in the Skies.  
 Where he, by Wisdom sceptred, from her  
     Throne,  
 Shall reign o'er all superior, and alone.

**F I N I S.**

12 JY 64



